

November 24, 1999

California Energy Commission  
Dockets Unit  
1516 Ninth Street, MS-4  
Sacramento, CA 95814

Re: 99-DIST-GEN-(2)

QUESTIONS FOR THE SITTING COMMITTEE WORKSHOP ON INTERCONNECTION  
RULES

Southern California Edison (SCE) welcomes the opportunity to provide written comments to best identify the issues for discussion at the California Energy Commission's (CEC) December 6, 1999 workshop on distributed generation (DG) Interconnection Rules. SCE believes the CEC should adopt a phased open and public workshop approach to the establishment of interconnection standards for distributed generation. While it may be possible to agree to statewide standards for DG installations of up to five megawatts, the initial focus of the workshop process should be on establishing standards for installation of type tested, pre-packaged units whose installation on radial distribution lines does not exceed 200 kilowatts at a single customer location and where the density of installations on any one circuit is relatively low. After reaching consensus on standards for type-tested, pre-packaged units, the CEC could move to a second phase of workshops addressing the complexities of larger DG installations.

SCE's answers to selected questions contained in the November 10, 1999 CEC request can be found in Attachment 1.

Very truly yours,

Michael D. Montoya

MDM:aa:LW993260118

## **I. Scope Of Technologies To Be Considered For Standard Interconnection Rules**

### **A. What size range of generating technologies should be applicable to the interconnection rules being considered in this proceeding?**

Distributed Generation (DG) encompasses a variety of generator sizes, technologies, and applications. It is possible to develop California statewide rules guiding the technical requirements and procedural process for interconnecting all DG units. However, it may be more feasible for this proceeding to utilize a phased approach by initially focusing on uniform interconnection rules for DG installations of 200 kW or less. While the Utility Distribution Companies (UDCs) have and will continue to arrange for the interconnection of any sized generating facility, SCE believes initial focus on rules and standards for pre-packaged, type-tested installations where the installed capacity at any one location and on any one circuit is reasonably limited, will allow a set of technical, procedural, and operational standards to be adopted more quickly. Once standards are adopted for the installation of such smaller, and more standardized units, the interested parties will be better situated to also come to a consensus for a uniform set of rules and procedures for larger, more complex installations in a second phase of workshops. New York has made great progress in adopting standards by addressing similarly sized installations sited on radial distribution lines. It is recognized that the common rules being developed in Texas have taken a broader approach, but it is yet to be seen how its proposed system will work in actual practice.

### **B. Should interconnection rules differ based on size range and technology? If so, how?**

Yes. While all sizes and technologies of DG installations must be designed and equipped to protect against the many adverse conditions that can cause electric service degradation, equipment damage, or harm to persons, the methods and procedures for achieving safe and reliable interconnections can differ considerably based on the technology of the generating facility, the size of the installation, and the nature of the UDC system where the interconnection is to be made. Interconnection rules should identify the safety and reliability issues which must be addressed, and the required levels of performance which must be attained. In addition to addressing the technical requirements for DG installations, the rules should establish a common process for requesting and approving the interconnection of DG units. Such procedures should also include an allocation of costs and a dispute resolution process.

### **C. Should electricity storage technologies be considered also? If so, what types should be considered?**

Yes. The interconnection standards should be applicable to any technologies that produce energy. These would include all engine or other mechanically driven generators, fuel cells, photovoltaic systems, and electricity storage technologies.

**D. Should the standards be independent of the mode of operation? In other words, should the same standards apply whether the intended function is for emergency or back-up use only versus primary use? Should any standards apply to an Islanded mode?**

DG interconnection standards should differentiate based on the mode of operation (isolated or parallel) of a DG facility. Generating facilities operating on an isolated basis do not necessarily need to be protected for the same conditions as those being operated in parallel with the UDC's electric system. The rules should recognize the nature of an installation and require only what is necessary for safe and reliable operation.

Safety and reliability rules should not be differentiated based on the use of a generating facility, but upon the nature of the interconnection. Isolated units may be treated differently than paralleled units, but an emergency generator that is to be operated in parallel with the UDC's electric system must be designed to meet the same requirements as a unit installed solely for economic purposes. Emergency or back-up generating facilities designed to only allow momentary parallels with the UDC's electric system may not require the same protection as facilities operating continuously in parallel, but adequate protection still needs to be provided.

SCE notes the terms *islanded* and *islanding* have been previously used extensively in technical papers, reports, and standards on DG facility interconnections to mean operation of a DG unit isolated *with a portion of the UDC electric system*, usually *accidentally* or *inadvertently*. In our internal practice, SCE has replaced accidental isolation with *islanding* in recognition of this widespread usage. Using the term *islanded* to describe a customer's system which is deliberately and permanently isolated from the UDC is likely to lead to confusion. Accordingly, it would be desirable to clarify the definition of the term *islanded* as quickly as possible. Given the current use of *islanded* in other contexts, SCE suggests the preferred term for a generating facility with no connection to a UDC is an *isolated system*. SCE believes the safety and reliability standards should apply to any generation capable of interconnecting and operating in parallel with a UDC, but should not apply to an isolated generating system. Rules governing interconnection procedures and the provision of standby or backup service, however, should apply to all DG installations.

**E. Should the same standards apply to new installations versus retrofit of existing self-generators or emergency generators?**

Yes. Any DG facility which has not previously been approved to operate in parallel with a UDC's electric system should fully comply with the interconnection requirements in effect at the time a change in mode of operation is made. Accordingly, an existing generating facility which has been previously operated only on an isolated basis for emergency or standby purposes should be required to meet any requirements established by these rules for parallel operation if such a change in operating mode is desired. SCE suggests that current DG installations, previously approved to operate in parallel with a UDC electric system be grand-fathered and allowed to continue to operate with their current protection packages. We believe the majority, if not all, of the generating facilities currently interconnected with SCE's system would meet the rules adopted in the workshop.

**1. What options should end-users have in terms of choice of interconnection voltage levels, and what are the consequences of these choices?**

UDC customers are provided service at standard voltage levels and service configurations appropriate for their load as described in each company's Rule 2. If a customer were able to independently choose its service voltage, the consequence could be an impractical or uneconomic condition under which the UDC would have to provide service. UDC coordinated planning of the distribution system is essential in order to yield the highest reliability and lowest cost. It should be noted that each UDC's Rule 2 typically provides a selection of interconnection voltage and service selections. Additionally, a customer may usually arrange for an interconnection at a different voltage on an added facilities basis.

**2. Are there utility-specific conditions that preclude the application of a single standard?**

SCE does not perceive any utility specific issues that would preclude the application of a single set of standards for all utilities. The interconnection standards established in these proceedings will have to be broad enough to encompass the technical, procedural, and operational issues associated with the various technologies and sizes of DG installations.

**3. The CPUC OIR excludes interconnection rules to the transmission side. Is there any need to revisit this decision? Can it be applied without exceptions?**

SCE concurs with the CPUC OIR requirement to exclude interconnection rules to the transmission side. Interconnection at the transmission level is governed by FERC jurisdictional agreements and rate schedules. The focus of this proceeding should be on interconnections that fall under CPUC jurisdiction. Thus, only DG interconnections with distribution facilities where the DG sells power only at retail should be addressed; interconnections of DG that will sell wholesale energy and/or ancillary services are governed by the WDAT tariff and are FERC jurisdictional issues.

**II. Need For California Standards And Replacement By National Standards**

**A. Which states have made similar efforts to develop interconnection standards? What is the scope of these efforts? To what extent can the work of other states (e.g., Texas and New York) serve as useful starting points for this effort?**

SCE suggests that the working groups review the work of the states of Texas and New York for applicability to California. If the working groups were to begin with a general understanding and appreciation for the proposed Texas and New York standards for the interconnection of DG units on radial distribution lines, it will greatly aid in reaching consensus within California.

**B. What efforts have been made within the state to develop a California consensus on interconnection standards?**

SCE is a member of the California Alliance for Distributed Energy Resources (CADER) and has participated in workshops and conferences hosted by CADER. Additionally, SCE notes that a report on Interconnection in California - Connecting Distributed Generation to the Grid, was prepared by ONSITE SYCOM Energy Corporation and presented to the CEC on July 21, 1999.

**C. What is the scope and timing of the IEEE P1547 Distributed Resources Interconnection Standard Working Group?**

SCE is participating in the IEEE working group and will defer to the hosting party to comment on the scope and timing.

**D. To what extent do California utilities, manufacturers, and other interested parties participate in the IEEE P1547 Working Group process? How would the development of interim standards in California affect the progress of the IEEE P1547 effort and its representation by California entities?**

SCE currently sends a representative to the IEEE P1547 working group and plans to continue our participation.

**E. Can interim standards developed in California be considered effectively in the IEEE P1547 effort?**

Yes. Any standards adopted as a result of this working group should be sufficiently universal such that they would be easily incorporated into the IEEE process.

**F. How would interim standards be adopted and enforced in California? Should they apply to public utilities as well as the CPUC-regulated utilities?**

The interim standards would be adopted through the OIR decision process with appropriate opportunity for parties to comment, and reply comment, on the draft CEC reports. The CPUC would have the same jurisdiction over the investor owned utilities that they have today. SCE believes the standards adopted here should apply to all utilities in California. In the interest of establishing a level playing field, all parties should operate with a common set of standards within the state. From a safety perspective, as utilities share employees during times of mutual aide, it is in the best interest of all parties to have a common set of standards applicable to the interconnection of DG facilities on the distribution system.

### **III. Safety issues**

#### **A. What are the major safety issues associated with DG interconnection?**

A utility must have total control over a customer's ability to energize an otherwise dead line connected to the UDC system. If a utility does not have this control, and a customer energizes or continues to energize a portion of the UDC's electric system which has otherwise been de-energized by the UDC, the result can be harm to utility employees and the public, electric service degradation, and equipment failure. Voltage and frequency mismatches can also have the potential to cause damage and/or injury. Additionally, improper protection and/or operation can result in service outages undermining service reliability on a specific circuit.

#### **B. What safety characteristics/protective devices are required of the DG machinery itself?**

A generating facility, which is or can be connected to a utility's electric system, should be designed and operated so as to prevent or protect against the following adverse conditions. These conditions can cause electric service degradation, equipment failure, or harm to utility employees and the public:

- Re-energizing or continuing to energize any utility line or bus which has been de-energized or disconnected from the utility's source of supply, unless such interconnection is requested by the utility and agreed to by the utility and the producer
- Interconnection while out of synchronization
- Over current
- Voltage imbalance
- Ground faults
- Frequency outside permitted limits
- Voltage outside permitted limits
- Poor power factor or reactive power (VAR) flows outside permitted limits
- Abnormal wave forms

The type of protection packages required of DG machinery are dependent on the size and technology of the DG machine, and nature of the UDC system at the location where the DG unit is to be interconnected.

#### **C. What safety characteristics/protective devices are required for the interconnection device? Is there a need for a disconnect switch in every instance? If not, what criteria triggers the need for a disconnect switch?**

The protective devices for DG interconnection must possess characteristics to protect against the safety concerns SCE described in question III B. National and local electric codes, as well as good design practices require a disconnect switch for each generating unit. It is preferable to have such a disconnect switch located at or near the service panel. This allows utility, as well as safety personnel (such as fire and police), to disconnect the DG if safety conditions require. If the disconnect switch is not located at the service panel, or in another equally

accessible location, the utility and safety personnel must have the ability to disconnect the customer's entire service as required.

While supporting the position presented above, SCE does not require an accessible separate disconnect switch for every DG installation. For installations where the service is rated at 200 amps

or less and that use a self-contained meter, the service can be disconnected by removal of the meter from the meter socket.

**D. What installation testing procedures should be required? Is there a need for periodic retesting? If so, how often and by whom?**

The requirement for installation testing is size and technology dependent. As discussed in the answer to question I B., implementation of type testing and standardized interconnection procedures for installations less than 200 kW would allow manufacturers and/or customers to install and test DG units with minimal UDC involvement. Utilities could rely on local agency inspectors for installation approvals. However, the UDCs should retain the right to inspect or test a facility (either directly or through an approved third party) if it becomes apparent that a generating facility is operating unsafely or causing disturbances to its electric system.

Periodic re-testing is required, and is performed now by customers with DG installations. These tests are reported to the utility. This practice should continue for installations under the standards adopted in this proceeding.

**IV. Feasibility of type testing**

**A. Should type testing be incorporated into the interim standards development process? If so, what factors should be considered in the development of standardized testing processes for various DG types?**

Type testing should be incorporated into the set of standards developed through the workshop process. The size of the DG installation, the DG technology being installed, and the density of installations on a distribution circuit are factors to be considered in the development of type testing standards. Type testing should initially be limited to DG installations of less than 200 kW.

**B. What entity(ies) should certify the equipment? Should self-certification by the equipment manufacturers be allowed?**

A nationally recognized entity such as Underwriters Laboratory should be used to certify DG equipment. Self certification could be allowed if the design, manufacturing and quality control process used by an equipment manufacturer is conducted in a method such as Underwriters laboratory requires.

## **V. Information and training to be provided to government agencies**

### **A. What information and training should be provided to fire departments and emergency response personnel?**

The training of fire, emergency, building, and air quality personnel is a matter of local jurisdictional entities. SCE encourages local agencies to become involved in the workshop process.

### **B. What information and training should be provided to local building officials?**

See answer to V A.

### **C. What information should be provided to air quality districts?**

See answer to V A.

### **D. What information should be provided to the CEC under its generator data regulations? (e.g., fuel type, capacity rating, location, etc.)**

The reporting of data to the CEC under its generator data regulations should apply to all generation.

## **VI. CPUC Rule 21 changes**

### **A. What changes are needed to Rule 21, (e.g., the elimination of qualifying facility (QF) distinctions?). Are complementary changes to other rules required?**

SCE has proposed to eliminate the qualifying facility distinction of its standby rate schedule and Rule 21 through Advice Letter 1410-E dated October 19, 1999. While SCE's Advice filing did not presuppose the outcome of the workshops for interconnection standards, or the DG OIR, SCE proposes that the changes in Advice Letter 1410 be adopted in this proceeding as permanent with the basic premise being that a utility should be afforded the opportunity to recover the cost to serve the DG standby customer.

### **B. What education and training efforts are required in order to process interconnection applications, should they occur in significant numbers?**

SCE is in the process of implementing a single point of contact to streamline the DG interconnection process. We plan to post the standard agreements, rules, and applications on a WEB site to facilitate the accessibility of our DG interconnection requirements. We also plan to accept electronic applications.

## **VII. Advanced communications and metering to facilitate dispatch or scheduling**

### **A. What are the major issues surrounding DG-UDC communications and metering? To what extent can experience with the QF industry provide a useful framework?**

SCE recommends that the protocols for DG dispatch be addressed in the planning workshop. It is difficult, if not impossible to determine the metering and communication requirements to facilitate dispatch or scheduling prior to the protocols being established.

### **B. What protocols are needed to govern the dispatch of DG facilities?**



SCE recommends that the protocols for dispatch be addressed in the planning workshop.

**C. What type of hardware or functional requirements should be required?**

The hardware requirements for interconnection will vary with the size, technology, and density of the installation as discussed in several previous questions.

**D. Do larger-sized distributed generation facilities need ISO dispatchability?**

SCE recommends that the protocols for dispatch be addressed in the planning workshop.

**E. Could ancillary functions be accomplished without utility distribution company dispatch?**

Ancillary services are an ISO controlled function and are not an appropriate topic for this workshop.

**VIII. Contractual issues surrounding interconnection rules**

**A. To what extent can interconnection agreements be standardized? In what respects must they be customized?**

SCE believes interconnection agreements and the interconnection process can be standardized based on the size of the installation. A simple agreement is possible for installations below 200 kW. While the complexity of interconnection agreements may expand with the size of the installation due to the requirements for utility owned protection or monitoring devices and other issues, uniform agreements and interconnection standards can be adopted by the state s UDCs.

**B. Are there any liability requirements to be included in the agreements? What is the current situation and what is the insurance industry's position?**

Yes. Interconnection agreements must clearly and fairly identify the parties obligations and assign liability where a party fails to meet those obligations. Moreover, the agreements should provide for indemnity where appropriate. With regard to the position of the insurance industry, SCE is not aware of any specific position taken by the insurance industry with regard to interconnection agreements.

**C. How can non-discriminatory implementation of the rules be maintained and enforced?**

If these standards are to only apply to regulated utilities, non-discriminatory implementation could be assured through regulatory oversight. If, as SCE recommends, the standards apply to all utilities, uniform implementation will be more complex. It may be possible to address this issue through legislation.

**IX. Procedural**

**A. What is the best approach to develop standards in this proceeding?**

A phased, open and public workshop process is the best approach to develop standards.

**B. Should working groups be formed? If so, how many and how should the work be divided among several working groups?**

SCE recommends two working groups be established for the DG interconnection workshop. The two working groups would be a technical requirements group and an interconnection process group.

**C. How long should it take to develop standards based on the work of other states?**

SCE believes the schedule in the DG OIR is reasonable if the workshop initially focuses on DG installations on distribution radial lines that are less than 200 kW.

**D. Can the schedule for interconnection rules adopted in CPUC R.99-10-025 be satisfied? What process of oversight and facilitation is appropriate to ensure that the schedule is satisfied?**

SCE supports the schedule in CPUC OIR.99-10-025.

**E. If a working group process cannot provide consensus in the time available, what formal procedures should the Siting Committee employ to provide an opportunity for consideration?**

SCE recommends a report similar to that generated by the Direct Access Permanent Standards Working Group (PSWG). If consensus was not reached in the PSWG, the position of each party was stated in the report in a non-biased manner. Participants then had an opportunity for comments and reply comments prior to the Commission issuing a decision.